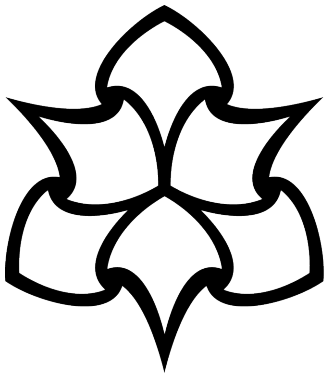

The Language and Communication Characteristics of Communication Aids – a Systematic Review

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Abstract. A systematic review of the language and communication characteristics of communication aids considered in identifying the appropriate aid for a child is introduced. The aim is to improve the decision-making around the provision of symbol communication aids to children.

Keywords. AAC, Communication Aids, Children, Systematic Review.

Introduction

Symbol communication aids are used by children with little or no intelligible speech. The positive effects of use are well documented, for example as reported by Dada & Alant [1]. Communication aids are provided following multi-professional assessment, yet Johnson et al. [2] note significant variation in provision and unacceptably high levels of abandonment of between 30-50%. There are no evidence based guidelines to support the multidisciplinary team and families involved in these decisions.

The work presented in this paper is part of the wider I-ASC research project [3] : "Identifying appropriate symbol communication aids for children who are non-speaking - enhancing clinical decision-making". The main research aim of I-ASC is to develop processes for optimising decisions about the choice of symbol communication aids. These decisions are based on characteristics of the child, the family and their context, and characteristics of the symbol communication aid – but these characteristics, and how decisions are made based on these characteristics, are poorly understood.

The study addresses key research questions aimed at improving the outcomes for children using symbol communication aids:

1. What characteristics related to the child, their context and communication aids, do clinicians consider important in making decisions about the process of provision of a communication aid?
2. What other factors influence or inform the final decision?

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3. What characteristics are considered important by other participants (e.g. the child and family) and how do these impact on communication aid use in the short, medium and long term?
4. What decision support guidance and resources are needed to enhance the quality, accountability and comparability of decision making?

A number of methods are being used to provide data to investigate these research questions. Firstly, three linked systematic reviews have been carried out to identify, appraise and synthesise the current evidence relating to these decisions:

(i) speech, language and communication development with specific reference to children using symbol communication aids;
(ii) the language and communication characteristics of communication aids considered in decision making;
(iii) clinical decision making related to aided communication in allied health professions.

The other methods used include significant qualitative investigation of professionals' decision making and service users' perspectives on decision making and quantitative data gathering relating to professionals' decision making through stated preference experiments. The findings from these contributory stages will be integrated into a package of guidelines to inform the clinical decision-making process.

1. Methods

This paper will present the findings from the second systematic review. The question for this review was: "In considering the AAC literature on device attributes, what evidence exists to inform clinical decision making in relation to the language or communication attributes of graphic symbol based AAC systems?" The method followed the PRISMA protocol [4].

Papers were identified by searching of the EBSCO, EMBASE, PROQUEST, Scopus, Web of Knowledge, Cochrane Library and AAC journal electronic databases. Search terms used were broad and related to the various synonyms for 'Communication Aid' and also 'features'.

The title and abstracts of retrieved citations were reviewed in two stages. The second author reviewed all literature to exclude those papers that were not related to AAC. The second and first author then each reviewed the title and abstract of the remaining literature for relevance to the research question. Those meeting the inclusion/exclusion criteria were retained for full paper review. Finally, the full text of the remaining papers was reviewed by both authors to provide the final list of included papers. Where papers were not included by both researchers these were discussed and a consensus opinion agreed.

Papers were included if all these criteria were met:

- They reported a study of the language or communication attributes of graphic symbol (non literacy) based AAC systems;
- The participants have developmental disabilities and speech that is insufficient for daily needs;
- The paper was written since 1970.

Papers were excluded if any of the following criteria were met:

- The participants have acquired disabilities;

- Participants are at a pre-symbolic level (where they make up more than 20% of participants or where results can't be disaggregated).

Quality appraisal was carried out independently by the first and second author using the Crowe Critical Appraisal Tool [5]. Finally, a data extraction table was designed, based on the research question and piloted by the second author.

2. Results

54,673 papers were identified from the database search with title and abstract review reducing this to 503 papers and full text review to 11 included papers which were appraised for quality.

3. Discussion

At the time of writing the data extraction and synthesis of the included papers was not complete. However it is clear that, despite the high return rate from the initial database searches, there are few included studies investigating the attributes of symbol communication aids. No studies were found where the primary objective of the study was to investigate a specific device attribute and no studies are included of symbol vocabularies/language packages that are observed as being used in practice. Also of interest is to review the literature that was excluded at full text review stage. This included literature on the following topics:

- Iconicity and symbols: a literature exists investigating iconicity or the ability of participants to locate or match symbols. However, little literature was found studying the properties of symbols when used in aided AAC systems.
- Vocabulary selection: a number of papers use varying methods to attempt to identify what words or phrases may be appropriate to include on a communication aid. However there are few studies where these decisions are tested in a study of use of an aided AAC system.
- Speech output: A number of papers have compared synthesised voices in terms of quality, intelligibility or listener perception. However, no studies investigated these variables as part of an aided AAC system.
- Studies of communication modes: a number of studies investigate the effect of different communication modes or systems, but do not investigate a specific attribute of these systems.
- Participants: there are some studies involving typically developing children which study relevant attributes, however this is not an extensive literature and did not meet the inclusion criteria for this review.
- Software development: a number of papers describe the development of an AAC system that the authors claim to be novel. However, few systems were developed or evaluated with the aim of investigating a specific attribute.
- Implementation/training: there is a literature relating to the implementation of AAC, and some papers investigate training programmes that relate to a specific communication aid attribute. However, these studies look to observe the effect of the training programme, not the attribute.

It is suggested that the large number of papers identified through database searching is indicative of the varied terminology, indexing and reporting of AAC studies. It is also suggested that the relatively large number of papers reviewed at full text stage demonstrates a trait that appears to be present in the reporting of some AAC studies: that is to conclude that study findings may be beneficial to the selection of appropriate communication aids, even though the objective and design of the study reported in the paper was not directly investigating this.

4. Conclusions

This systematic literature review will contribute to the existing evidence that can inform decision making processes related to symbol communication aids.

In considering an assistive technology model such as MPT [6] with regards to symbol communication aids, initial findings from this review suggest that there is little published data to inform the 'technology' aspect of these decisions. Further work within the I-ASC project will investigate the other perspectives and aspects of these decisions and gather new empirical data. These data, and the development of an initial decision making heuristic, will promote the improvement of these decisions and ultimately the outcomes for children who use symbol communication aids.

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